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Date: July 7, 1997

Subject: Weevil feeding damage in the Lava Progeny Test Site (Report # NE 97-8)

To: Chuck Frank, Geneticist, North Zone Tree Improvement

Upon receipt of a pest detection form from Barb Zylstra, Culturist, and Chris Click, Silviculturist and Timber Management Officer, Big Valley Ranger District, Modoc National Forest, I conducted a field evaluation of the Lava Progeny test site on May 27, 1997. I was accompanied in the field by Barb Zylstra and Robin Petersen, Biologist, Forest Pest Management. Ranger District and North Zone Tree Improvement personnel had observed weevil feeding damage within the test site in early May. The objective of the field visit was to collect and identify the weevils, estimate the level of feeding damage and provide alternatives to limit/reduce future weevil-related damage.

The Lava Progeny test site is located on the Big Valley RD, Modoc NF (T24N, R4E, S22,27, see attached map). The plantation is 10 acres of 8 and 11 year old ponderosa pine trees. The plantation was row thinned during the fall of 1996. Current stand density is 900-1000 trees per acre.

Weevil Identification

Weevil collections were made throughout the plantation using a sweep net. The following weevils were collected: Scythropus elegans and the pine reproduction weevil, Cylindrocopturus eatoni. Adult Scythropus weevils feed on the needles of several pine species. S. elegans is a metallic blue-green, gold, brass or bronze species with lighter stripes along the margins of the wing covers. The adult feeding damage is characterized by a "saw toothed" type damage where chunks of individual needles are removed in a regular pattern along one edge of the needle. Usually the needle dies and turns reddish-orange beyond the point of damage. Under severe conditions, trees assume a generally brown appearance until the needles drop.

The life cycles of Scythropus weevils are not well documented. Information available on S. californicus, a coastal species, states that the eggs are laid in rows in a tube consisting of three needles (previous year) glued together. Upon hatching, the larvae drop to the ground and feed on pine rootlets. Pupation and adult overwintering occurs in the soil. The life cycle is believed to require two years. This species attacks only foliage that is at least two years old.

The pine reproduction weevil, Cylindrocopturus eatoni, attacks and kills several species of young pines in California. The adult is about 2.5 mm long by 1 mm wide. It has dark and light scales giving it a gray appearance. The eggs are pear-shaped, whitish and translucent. The larvae are small, cream colored legless grubs about 4 mm. Adult weevils emerge from infested trees in

May or June. They feed on pine foliage, twigs and stems for about 2-3 weeks. The female lays single eggs in some of the feeding punctures in the cortex of the main stem and twigs below the current year's growth. As the larvae mature, they tunnel between the wood and the outer bark. Pupal chambers are constructed in the outer layers of the wood. Late the following spring the larvae pupate, and then emerge about two weeks later. There is one generation a year.

The weevil usually infests young trees of about 18 inches to 5 feet in height, but will occasionally attack trees up to 10 feet in height. Weevil attack is usually detected when infested trees fade in the fall. Fading progresses from the top downward. Feeding punctures in needles and stems, usually occurring from May to mid-July, are evidence of attack. Damage has historically been greatest in plantations on dry sites, during drought years and in plantations suffering from brush competition. Attacks often result in tree death.

Feeding Damage

Scythropus weevil feeding damage was apparent on most trees in the test site. Damage was most noticeable on needles within the top 2-3 whorls. A general observation indicated that trees in the interior had more damage than those along the edges. In addition, the 8 year old trees appeared to have a greater amount of damage than the older trees. A random sample of 25 needles were taken from each of 12 trees in both age classes to provide an estimate of the number of needles damaged per tree. On the 8 year old sample trees 11 of 12 trees had greater than 60% of their needles damaged. In contrast, only 3 of the 11 year old sample trees had greater than 60% of their needles damaged. The adult weevil feeding will not likely cause any direct tree mortality. However, a reduction in growth rate should be expected until the level of feeding damage declines. After the infestation collapses, stand growth may continue at lower, higher, or similar rates as those prior to the infestation, depending on the effect of feeding on the health of the trees. The feeding damage may also predispose the trees to other insects. The unseen damage caused by larval feeding on the pine rootlets may be of greater concern than the readily visible adult feeding damage.

Evidence of pine reproduction weevil-related damage was not readily apparent at the time the field evaluation was conducted. Adults were flying; however, I did not find any feeding punctures or trees that had died during the fall of last year.

Discussion

Most insect-related damage detected in pine plantations can be attributed to the growing conditions in the stand. Overstocking, particularly on dry, low production sites, drought, and brush competition are typical factors which predispose trees to insect-related damage. There are several insects capable of causing damage to sapling size trees in plantations. Insect populations levels and associated damage levels fluctuate seasonally and often go undetected. However, additive stresses often elevate damage to detectable levels. Although some growth loss may be expected from the Scythropus weevil infestation, it is not likely to result in any mortality or have any long-term effects on tree growth and vigor. Little damage will be visible when the discolored foliage drops. In this plantation, the stocking level will likely

cause as much or more growth loss than that associated with other factors. Thinning young plantations and limiting competition from other vegetation will reduce the susceptibility to most regeneration insects. It will also shorten the period of time which trees area susceptible to damage from insects commonly associated with small size class trees. In most cases, damage can be limited or reduced by maintaining suitable growing conditions for trees.

Monitoring for insect and pathogen-related damage should be an ongoing effort in progeny test sites. Feeding damage by adult Scythropus weevils should be monitored next year to determine if the infestation is continuing and what effect the feeding is having on sapling health. The plantation should also be monitored for damage caused by the pine reproduction weevil; however, it should not be much of a concern as the trees are larger than those typically attacked by this insect.

Direct control of adult Scythropus weevils through the use of insecticides is rarely deemed necessary. However, under these circumstances, in a test progeny site, it may be a viable alternative if damage levels remain high for consecutive years. More information can be provided on insecticides if needed.

Please contact me at 916-252-6667 if you have any further questions or needs regarding the Lava test progeny site.

Sheri Lee Smith
Entomologist
NE CA Shared Service Area

cc: District Ranger, Big Valley RD, Modoc NF
Chris Click, Big Valley RD, Modoc NF
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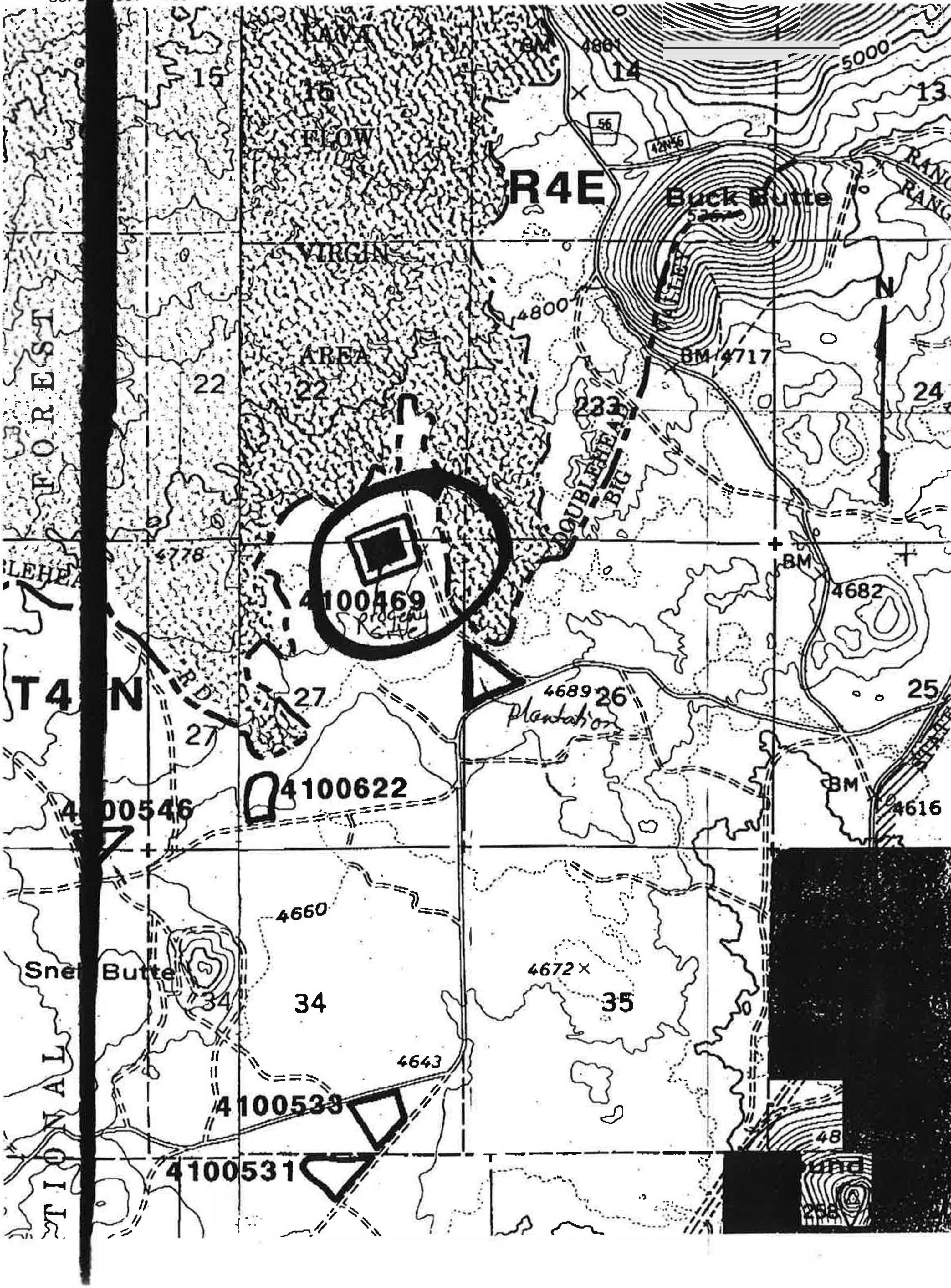
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